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Theory of finite-entanglement scaling at one-dimensional quantum critical points FRANK POLLMANN, SUBROTO MUKERJEE, ARI TURNER, JOEL MOORE, UC Berkeley — We present a quantitative scaling theory of finite-entanglement approximations at one-dimensional quantum critical points. Finite-entanglement scaling is governed not by the scaling dimension of an operator but by the "central charge" of the critical point, which counts its universal degrees of freedom. An important ingredient is the universal distribution of density-matrix eigenvalues (the "entanglement spectrum") at a critical point recently obtained by Calabrese and Lefevre. The theory is compared to the numerical error scaling of several quantum critical points, obtained by the infinite Time Evolved Block Decimation (iTEBD) method that extends the conventional Density-Matrix Renormalization Group (DMRG) algorithm.

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